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PRACTICAL METHODS OF CLEANING BEFORE ELECTROPLATING

C. E. Clindinin

Read at Chicago Convention 1933

THE subject has long been a topic of much discussion and is of vital interest to every plater who desires to do good work. The primary materials most commonly used are Silicates, Carbonates, Phosphates and Hydroxides; the latter being more commonly known as Caustics. Any one of these will clean in most cases but not efficiently at all times. We have learned to our sorrow that some cleaning compounds will start off doing an excellent performance and will just as suddenly go sour causing a loss of much time and materials.

The first cleaning requisite is a good cleaner compounded for the job you have at hand. This is no small problem and you should insist on the best. There are several large manufacturers of cleaners who realize the importance of this work and are employing men who are authorities on this subject. Choose your cleaners on the basis of uniformity, quality, cost and performance and if you study your problems assiduously and follow up your findings, your cleaning troubles will soon fade out of the picture.

Cleaning may well be classed under two heads: "Electrolytic" and "Non-Electrolytic", that is, with and without current. Since the latter comes first in sequence of operation it will be discussed first, and will be classified as:

(a) still soak
(b) mechanical

Both are chemical actions and are depended upon to remove most of the grease and other impurities which the grease causes to adhere to the metal whether it be the base metal or a plate being prepared for another electrodeposited plate. Greater speed and efficiency can be obtained by adding mechanical action and

this can be done by agitating the work or the solution but better still with the washing machine. A common comparison is the matter of dish washing. If the dirty dishes are merely placed in the water to soak, the action is very slow, but if placed in a basket and rapidly rotated or the solution forced through the mass the cleaning is done much more quickly and efficiently. The pre-cleaner on the plating line can generally be made up with cheaper materials and in the case of the washing machine only one-twelfth as much as required per gallon of solution. Also this pre-cleaner can be used long after a single one could be used. because of the protection of the electrolytic one which follows. And in like manner the life of the electro-cleaner is prolonged because most of the objectionable material is retained in the first cleaner or washing machine, as the case may be.

If the washing machine is properly constructed so that the pump can draw solution from mid-depth at one end of the reservoir, then the heavy particles can settle to the bottom and the partially emulsified and saponified greases floating on top will not be again sprayed on the work. The volume of solution required in a washing machine is less than one-fourth of that required in a tank cleaner for the same production speed. The alkali used in the washing machine costs only half as much per pound as a good cleaner and since only one-twelfth as much is required per gallon it can be readily seen that the ratio of cost is one hundred to one. This small cost can be saved many times over in the reduced amount of cleaner required in the cleaning tank.

The first question which arises when one contemplates installing a washing machine is "What design is best suited to meet my requirements?" Consider these questions: "What is the shape of the article?" "What is the condition of the surface?" "Must the recessed surfaces be plated?" "Do the recessed surfaces have to stand wear or salt spray tests?" "Does the shape of the article lend itself to be securely attached to a rack and withstand high pressure streams of cleaning solution?" "What is the composition of the metal to be cleaned?"

All of the above questions are of real importance if the most efficient results are to be obtained and for that reason they will be discussed at length.

No. 1 Shape of the piece; Medium sized and large pieces should be cleaned in the nozzle spray type machine while small ones can

best be cleaned in a mesh basket fastened to the turn table similar to the modern home washing machine.

No. 2. Condition of the surface: If the surface is highly polished and there is danger of scratching then more elaborate and labor costing methods must be adopted according to the specific job at hand.

No. 3. Plating of recessed surfaces: If these areas must be plated to withstand wear or salt spray it is necessary that they be well cleaned. The spray nozzle type is excellent for this purpose and the piece must be so racked that the pockets drain readily.

No. 4. Racking: This is one of the biggest problems in the use of the washing machine but some careful and logical thinking will solve most of the problems. Pieces of considerable weight that do not have holes or projections for secure racking be can placed in mesh baskets and subjected to high pressure streams.

No. 5. Composition of base metal or alloy: The washing machine is particularly adapted to the cleaning of zinc die castings that are greasy because of the ease of cleaning with a weak solution. With all grease and foreign particles removed the time required in the electrolytic cleaner is reduced to a minimum.

ELECTROLYTIC CLEANING

The most efficient electrolytic cleaning is obtained by the proper balance of temperature, time, current and chemical composition and strength of cleaning compound. The first point to establish is the time to be allowed for cleaning. This, of course, applies to a production line where each operation must synchronize with its neighbor.

Automatic and semi-automatic lines are ideal models of a perfect balance of the above variables. Assuming that the time is set to harmonize with another operation, then the temperature, current and cleaner must be set to meet that requirement. If the temperature is too high and the cleaner too strong, steel may darken or chromed nickel may be frosty. Work must be transferred from the cleaner to the rinse without loss of time to prevent the surface from drying, because of the difficulty of removing the stains thus formed. In nearly every case the current used in cleaning is much too low for good results. In most cases the cleaner tank is hooked on at the end of the line and gets what current the others don't take. No provision is made for measuring it. In some cases the cleaner unit is dignified with a separate

generator, but in that case the oldest and smallest power unit gets the job.

There are many cases when either a strong cleaner and short time or a weaker cleaner and more time work equally well and other points being equal the cost of extra drag-out in the former must be balanced against the extra time and higher voltage of the latter. It must be remembered that any time used more than is necessary is a waste of power and in some cases produces inferior work.

Do not use the cleaner tank as the anode. One eighth inch thick boiler plate nickel plated makes ideal anodes and are very much in use at the present time. Plates properly cleaned and plated will last for years and the voltage required to produce a given current density is enough lower to please any cost man. And likewise with the same source of current a higher amperage and better cleaning is obtained. These anodes can be removed readily cleaned and returned to the tank as good as new.

The cleaning of tanks used as anode is a serious problem and, in many cases, is not attempted. Impurities are allowed to accumulate until the work is impaired and then the more or less fanciful reverse current is resorted to. This is only a make-shift method and is comparable to the man who takes a lot of dope to ease his toothache when in reality he should have the cause removed. To clean the sides of the tank, the solution must be removed but the nickel plated anodes can be removed and cleaned within thirty minutes and because of their accessibility they are kept in good condition.

Air agitation adds very materially to the efficiency of a cleaning solution. It not only prevents the forming of a concentrated layer of solution on the bottom of the tank but in the case of cleaning compounds containing grit such as volcanic ash it causes a scouring action. Unfortunately or fortunately air agitation will not permit one to neglect their cleaners and allow them to become loaded with impurities. In many plants cleaners have been and still are looked upon as evil accessories and have received attention apropos to this feeling with the result that heavy losses have been incurred due to peeling, pitting and poor color. Cleaning is of extreme importance and it should be given plenty of study and thought.

Cleaners must be chosen for the particular work they have to perform. In some cases one cleaner is expected to efficiently

clean several kinds of materials ranging from brass and zinc die castings to heavily grease-coated steel stampings. This is requiring too much of any cleaner as the resultant work indicates.

Every plater should know the efficiency of the cleaner he is using and by that is meant the relative speed, cost and quality of cleaning as compared to other brands of cleaners. The following is a simple, practical and conclusive method to determine the relative merits of cleaners and can be conducted by anyone.

Pour a pint of water into each of two beakers and heat to the temperature used in the cleaning operation in question. Add one-half ounce of the cleaner in use to one beaker and an equal amount of the cleaner to be compared to the second beaker. Stir until all soluble material is dissolved. Select two pieces of metal similar to that which you are plating; that is, if you are cleaning steel use shim stock, if brass, use strips of brass and so on. The test is carried out in two steps, emulsification and saponification, using mineral oil in the former and vegetable or animal grease in the latter. The procedures are identical. Procedure: Coat the two pieces of test stock with a thin film of oil and place one in each cleaner for one minute. Remove, rinse in cold water and examine for water break. Add one cc of oil to each cleaner, wipe the test pieces clean and dry, coat with oil as before and repeat the cleaning test. Continue until both show water break. Some cleaners containing ten to twelve times as much grease and oil as others will still do a better job of cleaning.

You will note that you are directed to continue until both show water break. In a recent test one cleaner showed water break on the first two steps of the test but in the final test showed itself to be much superior. Ultimate costs are what count and the above is a precaution against hasty decisions. The above tests can be continued electrolytically if the previous tests so warrant.

Much has been said on the merits of or demerits of fused cleaners versus cleaning mixtures. Uniformity of product and uniformity of action are of extreme importance. Some cleaners are not uniform. Others start off well but lose strength rapidly and must be replenished often. Poor quality and high costs are the results. Additional agents are sometimes resorted to to produce certain results, two of the more common ones being rosin and caustic soda. Additions should be made for a specific reason and the amount to be added as well as the nature of its action should

be clearly understood. Haphazard additions to a reputable cleaner generally cause far more trouble than good in the long run. A small amount may be a corrective measure whereas an excess will be a purgative.

The proper compounding of cleaners requires technical knowledge and experience. For example, let us consider surface tension. The effect of any cleaner on the surface tension of its solution is dependent upon many conditions, such as the number and kinds of individual ingredients present, the concentration of each ingredient and its molecular weight, the degree of ionization, and so forth.

In extremely dilute solutions, the components of a simple mixture are completely ionized and reactions between them are carried to completion. However, in most cases, several different reactions are possible and unless all conditions such as temperature, pressure, concentration, and so forth, are accurately and carefully controlled, reactions other than those desired are apt to result. In more concentrated solutions, ionization is hidden by other effects, such as hydration and alteration of electrical forces, and it is impossible to control results. An equilibrium will be reached which may be far from completion and the resulting solution may have altogether different properties from those desired.

With a chemically formed cleaner, during process, each reaction between raw materials is carefully controlled and carried to the desired state of completion. Raw materials which might react to give undesired products are not added until the proper time when other reactions have been completed. The finished product, when put into solution, does not depend upon chance results, but is complete in itself.

The addition of a moderate amount of caustic soda to a cleaning solution, the amount to be determined by analysis and experience, will retard the tendency of the cleaner to dry on the work before it reaches the rinse tank. Resin, because of its composition, should be treated differently. Resin is composed of approximately eighty per cent free abietic acid, five per cent combined abietic acid, unsaponifiable matter, and complex esters and decomposition products of abietic acid formed during distillation. The lower the grade of resin the less desirable it is for use in cleaners as a direct addition and water white resin is hard to find in a plating plant.

The difference between fused in resin and boiled in resin is probably due to the fact that during an ordinary saponification process the temperature does not get high enough for the alkali to have much effect on that part of the resin which is not free acid. With a fusing process, however, a vigorous reaction takes place completely saponifying the free acid and also reacting with the other portions of the resin, forming complex salts which are entirely different in character from the original resin or from the ordinary products of saponification. It may be that in the unaltered state this part of the resin tends to check the cleaning action of the sodium abietate formed by simple saponification, or it may be that the products formed during the process of fusion have a decidedly beneficial effect and tend to assist the cleaning action of the fused product.

Cleaning is the foundation of the plating structure; be sure that it is as nearly flawless as you can make it. Perfect cleaning is possible, choose the best materials and processes and with earnest effort you can obtain results of which you can well be proud. (Applause)

STANDARD SPECIFICATIONS

It is hoped that Standard Specifications for plating on steel can be prepared and presented in the near future by the American Electro Platers' Society from the results obtained on the nearly completed atmospheric and accelerated tests of electroplated metal coatings on steel which have been conducted under the direction of Dr. Blum at the Bureau of Standards. In view of this and the projected research on brass, copper and zinc die castings, the Educational Committee thought it would be of interest for our members to learn what type of electroplating is specified abroad and therefore requested Mr. Thomas to copy the following:

PLATING SPECIFICATIONS OF THE NATIONAL SOCIETY OF BELGIAN RAILROADS, Galvano, Sept. 1933, page 14.

Nickel and Chromium Plating.

A—Pieces of bronze, brass, or German silver used on the exterior of carriages. The pieces will be treated in the same manner, whether they are cast, drawn or rolled.

The pieces must be given a thick layer of nickel before being chromium-plated.

1. Nickel Plating.

The nickel plating should have a thickness of at least 0.025 mm (0.001")

The deposit must be able to withstand the following thickness test:

On a clean portion of the nickeled surface, previously cleaned by any grease with a mixture of equal parts of ether and alcohol, one drop of a solution made up of 80cc nitric acid, 20cc sulfuric acid (66° Be′), and 40 cc distilled water, acts for one minute, then is replaced by another drop, acting on the same place for the same time, and so on. The test is repeated three times on three different spots of the piece. On the thinnest spot, the underlying metal should not appear before the sixth drop.

Such a nickel deposit will not be obtained from firms using a cold bath at low current density. Applying only to firms using a warm or hot bath with a current density of 6 to 12 amp/dm² (56 to 110 amp/sq.ft.) As an indication, the plating should continue about a half hour, the temperature being about 40°C (104°F) and the current density about 6 to 8 amps./dm² (56 to 74 amps./sq.ft.). This time takes into account the decrease in thickness which will result from polishing.

2. Chromium Plating:

After nickel plating, the pieces must be given a coating of chromium of at least 0.001 mm (0.00004″) thickness.

The deposit must be able to withstand the following thickness test:

On a clean space from which grease has been removed with ether and alcohol mixture, a drop of a solution made up from equal volumes of hydrochloric acid (22° Be′) and distilled water, acts for one minute, then is replaced by another drop acting on the same spot for the same time.

On the thinnest spot, the underlying nickel should not appear before the second drop.

A good deposit is obtained under the usual conditions of current density, temperature, and bath concentration at the end of ten minutes. Fifteen minutes of plating will give entirely satisfactory thickness of deposit.

B—Pieces of bronze, brass, or German silver used on the interior of carriages.

As for the exterior work, all pieces will be treated in the same way, whether they are cast, rolled, or drawn. All pieces must be nickel plated before being chromium plated.

1. Nickel Plating:

The nickel deposit must have a thickness of at least 0.010 mm (0.0004″). The pieces having undergone the thickness test given under A-1, the underlying metal should not appear before the third drop. Such a deposit should be obtained from any firm, but, for those using a cold bath and low current density, the time of plating must be about two hours.

2. Chromium Plating:

This should be done under the same conditions as those given under A-2.

C—Pieces of iron on steel:

These pieces can be treated, at your choice, in either of these two ways:

1—An initial nickel coating, followed by one of copper to a total of 0.015 mm (0.0006″), then a second nickel coating 0.010 mm (0.0004″) thick; and finally a coating of chromium 0.001 mm (0.00004″) thick. The pieces having undergone the thickness test given above, the copper must not appear before the third drop of the sulfo-nitric acid. For the chromium test, the nickel must not be laid bare before the second drop of hydrochloric acid.

2—Direct nickeling to a thickness of 0.025 mm (0.001") at least, followed by chromium of 0.001 mm (0.00004") thickness.

These pieces having undergone the thickness test, the iron must not show before the sixth drop of the sulfo-nitric acid.

The nickel must not be laid bare before the second drop of hydrochloric acid.

Note: The above specifications are appended to a criticism of the same by the editor of "Galvano".

The Question Box

GEORGE A. HOGABOOM

HAS *the old method of lining plating tanks with pitch and asphaltum been discontinued? Are rubber lined steel tanks practical for acid and alkaline plating solutions and acid pickles? Are tanks made of "Haveg" used for acid solutions?*

Answer. Tanks made of wood are still lined. Rubber lined steel tanks have in general replaced wood tanks for acid pickles and acid plating solutions. They have proven satisfactory in every respect and will eventually replace wood tanks. They are not, however, suitable for alkaline plating solution; neither is it necessary to use them as plain steel tanks are better.

We know nothing about the use of "Haveg" for acid solutions and would be pleased to have comments from any plater having experience with tanks made of that alloy.

"BUFFING AND POLISHING METHODS" is the title of a fifty-six page book published by the Lea Mfg. Co., Waterbury, Conn. It is a handy reference book containing detailed information on finishing. The data has been selected from a variety of actual production methods.

"Buffing and Polishing Methods" compares various finishing methods and serves as a suitable guide to relative savings. It also contains a complete description of the Lea Method of Metal Finishing. The use of patented buffing compositions is compared with the usual methods and ordinary types of compositions. A description of the use of dry abrasive coated wheels with a flexible surface to replace set up wheels in the finer numbers is given in detail.

Due to the lack of authentic information in accessible form on finishing room practices, the information contained in this book should be very helpful. It is the third edition and the result of several years compilation of facts gathered from many sources.

"Buffing and Polishing Methods" will be forwarded gratis upon request to anyone in the metal finishing industry desiring a copy.

Please mention THE MONTHLY REVIEW.

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Efficiency Methods

EDWARD H. TINGLEY

"Cooperation—the working together for the benefit of all of us"—This quotation taken from Mr. E. H. Tingley's article "Some Laws of Good Work," which appeared in the February Review, in my opinion is the written thought which best expresses the principle upon which our Society is founded and can best endure.

Here is presented the third article, "Some Principles of Good Management," and no member can possibly read it without deriving some benefit from the facts which are presented. "The man who knows has controlled and always will do so whether he has authority or not," is a quotation from this paper which must express the thought of many of our members who seldom miss a meeting of their branch, because they realize that there is where information is being disseminated on the technical and supervisory problems of an electroplater. T. F. SLATTERY.

SOME PRINCIPLES OF GOOD MANAGEMENT

By Edward H. Tingley,

Secretary, National Association of Foremen, Dayton, Ohio

"Reproduction forbidden without permission of the author"

THE success of any business depends very largely upon its management. No single factor has so much to do with the success or failure of business as management.

The only way management can satisfy the source of capital, the source of material, and the source of labor is in the manufacturing and selling of an article at a price that will satisfy these essential sources and leave sufficient financial reserve for depreciation, improvements, plant extension, better equipment, etc.

Management manages for labor, and management manages for capital. The capital investor and the labor investor look to management to manage their investments so as to keep both employed and bringing a return to both of them for their investments. Management is between the two and the servant of both.

There are two sets of factors that face management in its attempt to run a business at a profit. *Outside* and *Inside* are

two groups that must be managed correctly if success is to be obtained. The outside group includes the numerous competitors, stockholders and customers; the inside group are the men and women who make up the organization and are classed as employees. To us, who are working in various factories in the capacity of superintendents and foremen, management is turning over the problems of handling the inside group. Our job is to build up the men and women in our organization so that we all can assist management in its serious and trying problem of making a profit. So in this discussion, we will limit our remarks to a few principles of good shop management that all of us can use every day to make our jobs of supervision more effective.

1. DELEGATE AUTHORITY ALONG WITH RESPONSIBILITY

In asking a man to perform a given task, make sure that he is told clearly what he is expected to do. Let there be no misunderstanding as to what is wanted, but avoid too much detail as to how he is to do the desired task.

A man learns to think by thinking, and if given too much detailed instruction—too much of the how,—his thinking will be to simply follow instructions and not to think out his own way of performing the task.

In one instance, men imitate; in the other, they initiate. Men learn to initiate by initiating; men learn to do by doing. When a manager ostensibly puts it up to one of his men to do a thing, but does it in such a way that the man feels he must come back to ask about every little move before he acts, the task has not in reality been put up to him at all. He has been made responsible for the job but has not been given authority to go ahead and work it out in his own way, meeting and surmounting obstacles as he comes to them.

The desirable thing is to cause the people of a department to feel that they are in business for themselves, on the company's capital. The interest they then take in their work will cause them to stay with the company which reduces labor turnover and accomplishes many other desirable effects within the organization.

Each keyman should ask himself if he is affording the men under him opportunity to do things, or if he is hanging on to things so that all his people can do is to keep him busy trying to keep them busy.

Many a "would-be" executive is daily asking the men in his

group to become responsible for work, and at the same time tying their hands in a way that gives them little freedom to work.

A manager must be sure that those under him are given opportunity to develop their ability to think, and that he is not unconsciously throttling their initiative by withholding authority.

"A real executive" delegates authority along with responsibility. As a result he is found "on top", nicely supported by his organization.

"A would-be executive" delegates responsibility and withholds authority. As a result he is found underneath, carrying his entire organization and all their troubles.

Let there be no misunderstanding. Authority is not a thing an executive should put on, and thereafter assume that he has special dispensation to lord it over those under his supervision. Some key-men grow when given authority, and some only swell. No man has authority to tell any man what to do. The kind of executive authority that accomplishes the best results is not arbitrary and despotic, but conciliatory and democratic. In last analysis, in a free country all any man is authorized to do is to authorize other men to go ahead and do. He cannot cause men to do—that's up to the man.

One of the things that lies at the root of failure to co-operate in a progressively profitable manner is the domineering way in which too many supervisors of men lord it over those given to their keeping.

If peace is to be maintained in industry, superintendents and foremen must supplant autocracy with democracy in their treatment of their people. Authority, from the standpoint of the executive exercising authority, is like a revolver; it is a good thing to have, but a mighty poor thing to use.

Authority is becoming more obsolete every day. As a matter of fact, the man who knows always has controlled and always will do so, whether he has authority or not.

There is too much holding back on the part of key-men in industry, under the pretense of lack of authority. Any man can go ahead and do right without authority. "Will it suit my boss?" is not the question. "Is it the right thing to do?"—that's the important question. If it is, do it.

Responsibility is not the cause of promotion. Assuming it and qualifying under it is the cause of promotion. A regular

fellow is one who sees a thing that needs to be done, and does it. He stops the leak in the dike, the runaway team, the racing motor, and takes his chances on getting locked up for acting without authority. Recognize a need for usefulness and assume authority to act. When anything needs to be done and it is possible to do it, do it.

There will be a big difference in the results attained when executives have caught the full significance of the difference between

Holding on to authority and using it,
and
Letting go of authority by giving it.

Again, authority is a good thing to have, but a dangerous thing to use. It is well for an executive to pass on to the people under him all the authority that comes to him, and authorize them to go ahead and use it. When authority comes to him from above, he should pass it on. Never should he be caught with any of it in his possession.

Too much supervision, too intimate a relation between the key-man and his men, creates a handicap similar to that of men tied together in a three-legged race. They are ready to go and expected to race, but so fixed that they cannot.

The moment the United States went into the World War, vast cantonments sprang into being, almost overnight. Warehouses fifty feet wide, totalling fifty miles in length, filled with food and supplies were placed on French soil as if by magic. Why? Because the War Department picked the right men for the work and gave them unlimited authority.

It is said of Marshall Foch that from the beginning he never interfered with the tactics of the great officers who so loyally served under him. He gave them a job to do and then let them go out and do it.

The one outstanding point that readily distinguishes the "real" executive from the "would-be" executive is that the one delegates authority along with responsibility, and the other delegates responsibility but withholds authority.

A man should be given a task by being told what is to be done, and then left to his own initiative.

Delegate authority along with responsibility.

2. APPRECIATION IS FAR BETTER THAN DEPRECIATION

Chas. M. Schwab once said, in discussing this matter of ap-

preciation: "I am a believer in the fact that men do their greatest accomplishments by proper encouragement, not by criticisms. I have yet to see the man, however great and exalted his situation, who is not susceptible to the approval of his fellow men. I have yet failed to see the man, who is worth calling a man, who does not put forth his best efforts under the approval of his fellowman. And the severest criticism that can come to any man is not to find fault with him, but not to notice him at all. When a man is not noticed he knows that he has not gained the approval of his fellows, but when he is approved, he gives his best effort. This has been a life-long theory of mine, one that I have put into practice for 35 or 40 years of industrial pursuit rather successfully and one which I think ought to be the keynote of everything we strive to do."

Express Appreciation When Merited.

There is perhaps no one thing, except money, which all people crave more than a kind word—a little recognition—a little encouragement—a little appreciation. The foreman or department manager who watches for things that his fellows do rightly and then lets them know that they have done well, gets loyal, enthusiastic support. Such a practice is much better than watching for things that go wrong, and then calling them up and calling them down. Kind words, publicly expressed, encourage men to risk thinking and deciding for themselves.

The executive who makes use of these suggestions will find that mistakes, oversights, muddles are automatically diminished and the need for elaborate expensive supervision reduced.

When a co-worker advances an idea or suggestion, a good executive will listen even though with the first word spoken he remembers that the idea was considered from all angles three years before, and at that time found to be impracticable.

Stop! Look! Listen! Why? Because there may be some new phase of the proposition advanced that will make it feasible to adopt at this time. But the big reason why an executive should be a good listener is that he does not want to dampen the ardor or sear the initiative of his men. If the executive isn't careful his helpers will soon acquire the habit of keeping their suggestions to themselves—they will kill them at the start—rather than afford the man in charge the seeming satisfaction of killing them.

"We had that up last August." or, "I thought of that long ago

but it won't work," or, "No use trying that, it can't be done," and similar expressions destroy initiative and leave the soul of the would-be-glad-to-help subordinate craving a word of appreciation. Appreciation costs nothing and brings much. When everybody within an organization gets to using it, it produces an atmosphere—a morale—that reduces labor turnover, increases production, and pays dividends.

The executive who understands men and women is never curt or overbearing to his subordinates because he knows it stifles spontaneity, deadens interest, and fosters deception. He avoids constantly finding fault and reminding men of what he regards as their weak points. They are human, as he himself is, and a little sincere, well-merited praise, judiciously administered, will accomplish far more than criticism.

"I notice you stay on the job while you are here, Jack, and I want you to know that I appreciate it." It may pain many average executives to say this, but it will make Jack feel enough better to justify the efforts it takes.

Subordinate:—(recently out of high school)—"Mr. Jones, I have now been here six months, and I was wondering if my work was satisfactory?"

Superior:—(in gruff tones)—"You are still here, aren't you?"

The young man's soul was hungering for a kind word. He had waited long for appreciation and when he sought it, received only a curt answer. When things go right, nothing is said. When they go wrong, the fact is made known. Men are worse than beasts; even pigs will grunt their approval when fed a good meal. Oh, that key-man would do as much in return for the support they receive!

How many married men approve, by word or look, the good food cooked for them, and the well-kept home? Things that come as they should are accepted as a matter of course, and nothing is said. Remarks are reserved for the time when something is wrong.

It is easy for one to criticize in others the very things in which he himself is weakest. It is human nature to think that the trouble is with the other fellow, whereas, if each would put his own house in order, the whole business-house would soon be in order.

When a fellow pleases you—let him know it;
It's a simple thing to do—let him know it.

It will help you in the fray, and he'll think his efforts pay;
If you like his work or way—let him know it.

—Elmo Martin.

3. USE SUGGESTION INSTEAD OF COMMAND

A Suggestion: "George, suppose you try a larger pulley on that line shaft—it might help us speed up production."

A Command: "George, get a 20-inch pulley on that line shaft at once—production's got to be speeded up."

Even though the command is given in a modified pleasant tone it is nevertheless a command, and the "command method" does not come up to the "suggestion method." A command demands acquiescence, a suggestion invites the judgment of the person addressed. To invite judgment is to stimulate thinking, and judgments results from thinking.

The power to think, like the power to lift, is developed by practice. "Thinking strength," like lifting strength, develops with use. Any plan that encourages people to exercise the function of thinking should be sought and used.

The unused thinking strength, bottled and dormant in the minds of men and women about the place, would, if the "stoppers" were knocked off, improve in a very short time, nearly every method of office, and process in factory. The man feeding the punch press, and the trucker moving the boxes of materials daily observe little irregularities, which, if corrected, would help much.

The "real" executive can well afford to make it a part of his work to knock off the "stopper." Whereas, many "would-be" executives busy themselves in "putting on stoppers." To be sure they do this unconsciously, but they do it just the same, and the result threatens red in the balance sheet.

All human beings have full equipment with which to think, and it is an important part of the function of every good executive to oil up that equipment and get it to working.

The "suggestion method" tends to cause the subordinate to think; the "command method" tends to retard all inclination to think.

Executive: "Why did you do that?"
Subordinate: "I didn't think!"
Executive: "Why didn't you think?"
Subordinate: "I don't know!"

Oftentimes the reason why the subordinate does not think is

because he is not sufficiently interested. The "reason why" he is not sufficiently interested is because initiative has been discouraged through the persistent use of "command" instead of "suggestion." The suggestion method stimulates thought. Thinking stimulates interest. Interest, in turn, stimulates thinking.

When foremen and other supervisors speak to subordinates, it is their custom to tell them to do, and not to ask them to do. Going back and back in search of the cause of autocracy it will be found that it starts by telling people what to do. Regardless of blood, breeding, class, or education, there is something in all men that resents being told what to do.

Frequently a very good man who has been well selected, properly trained, and satisfactorily paid will, after a time, leave the place he works and go elsewhere solely because an atmosphere has developed which seems to take all the zest out of his work. There is but one cause for such an occurrence, and that is wrong supervision. The one preventative is right supervision.

To suggest, when compulsion is impossible, and to guide when demands cannot be made, is common sense.

To suggest, when compulsion might be used, and to guide, when demands could be made, is a mark of skill in the supervision of men.

Every man is loyal to something. The bigger and better that "something" is, the more loyal he will be. Loyalty to work or to cause is in direct ratio to the importance of that work or cause. Fitting a spring into a watch may call for greater care and loyalty than fitting a spring under a truck.

A man's loyalty to his superior is limited only by the deserving qualities of that superior. Men cannot be driven, but they can be led. The spur of loyalty is more powerful than the spur of command. No general ever drove his forces to victory and no key-man will get very far driving his men to achievement.

A key-man has to go to the rear to drive and to the front to lead. The place for a leader is in front. The executive of today who persists in driving will be numbered among the also-rans of tomorrow.

"Trifles make perfection, but perfection is no trifle." Some of the smallest things are the biggest things when manifolded throughout the organization over long periods of time. "To Suggest" vs. "To Command," is just one of the big little things

that makes a great difference in the amount of desirable reaction from one man or from a group of men.

Use suggestion instead of command.

4. A MAN CAN SERVE WELL ONLY WHEN HE KNOWS THAT HE IS RECEIVING FULL CREDIT FOR HIS WORK AND HIS IDEAS

A conversation similar to the following can be overheard in almost any institution daily:—

"What do you think of that, Jack?"

"What do I think of what?"

"Why, didn't you just hear the G. M. ask the Super, as they were passing here, who it was that suggested raising that platform? The Super replied, 'Oh, we do a little thinking around here once in a while,' giving the G. M. the impression that it was his idea."

"Why, the lobster, I suggested that to 'his nibs' six months ago and now he is letting the old man think it was his idea. A fine chance a fellow has round here. They can go plum to the devil. The next time I get an idea that will save them money, I will keep it to myself. If anything makes me sore it is to have someone take my ideas and then take credit for them."

Men should always be given full credit for their work and their ideas. The wise straw boss, foreman, or superintendent will go out of his way to let the man under him know that he always gives credit where credit is due. That he tells the men higher up who makes helpful suggestions. This should be done for seven reasons:—

First:—It is right.

Second:—After the "boss" takes one idea from a man he has slight chance of getting any more ideas from the same man, or from others who hear about it,—and they will all hear.

Third:—If a foreman thinks he can run his department without the aid of those under him he is fooling himself, for he cannot.

Fourth:—If he thinks he is in line for promotion, he should think again, for he is not.

Fifth:—If he doesn't encourage his men to think, they may not.

Sixth:—If they don't think, the department is likely to stand still.

Seventh:—If the department stands still, the foreman will stand still. If he stands still, some live one under him is apt to pass him, for there are live ones in every department and

the live ones persist in being found. So he might as well get the credit for finding them. Then, too, many a man has been promoted for finding live ones. There are many successful executives who have made big money, and who are holding responsible positions simply because they find men.

There are three ways of rewarding men for their work and their ideas.

A. Money in the pay envelope.

B. Promotion to a better position.

C. Appreciation shown for work done and for ideas contributed.

The last is by no means the least. In some organizations they make it a rule not to promote a man unless he has a man under him in his department who can take his place and do his work easily without "jarring" the works. The way to discover who, under your supervision, can best qualify in your place, is to give full credit for work done and for ideas and suggestions contributed.

Men develop most successfully when given full credit for their work and for their ideas. This encourages them to come through with more ideas. No man can get up by holding other men down. Some deceive themselves into thinking that they can, but they cannot.

DISCUSSION QUESTIONS

1. Why is it not advisable these days for an executive to parade his authority too much?
2. How many men in your department are capable of accepting the responsibility of assistant foreman?
   How could they be trained to accept responsibility?
3. Can a foreman be given too much authority? Why?
4. Is it safe to give every workman the same kind and amount of praise?
   Why do some men need little praise?
5. How can a foreman indirectly encourage workers to make suggestions for improvements? Should adopted suggestions and the workers' names be posted on the bulletin board? Do money awards stimulate suggestions?
6. Why is it harder to use suggestions rather than commands? Do most men expect to be told how to do their work—or just what to do?
   What is the foreman's job if not to give orders?

The Abstract Section

EDWARD B. SANIGAR

THESE abstracts are mostly adapted, by permission, from "Chemical Abstracts", the references to that publication being given in the form — *C. A.*, **27**, 3402 (1933) *i. e.*, Chemical Abstracts Volume 27, column 3402 in the year 1933. The name appearing at the end of the abstract is that of the abstractor. Abbreviations for scientific journals are those used by "Chemical Abstracts" (see *C. A.* **25**, 6019 (1931)). E. B. S.

Production and deposition of indium. WM. S. MURRAY. *Ind. Eng. Chem., News Ed.* 11,300 (1933).—After detailing the commercial process of obtaining Indium, it is stated that the impure metal is purified by being plated out of a cyanide bath. A typical solution contains 5oz. (142g) indium as double cyanide, 9oz. (255g) free cyanide or equivalent of sodium cyanide, 2.5oz. (71g) sugar, and water to make 1 gallon (3.78l.). The deposit of indium is said to be soft, uniform and gray. E. B. S.

Rhodium. French patent No. 749,846. July 29, 1933. Baker and Co., Inc.—Rhodium is deposited electrolytically from a solution containing phosphate and rhodium ions in acid solution e. g., that obtained by the reaction of a rhodium compound with phosphoric acid in a sulfuric acid solution. Silver articles may be coated with rhodium in this way. *C. A.* **28**, 41 (1934).

Electroplating with tantalum. U. S. patent No. 1,933,319. October 31, 1933. F. H. DRIGGS and W. C. LILLIENDAHL (to Westinghouse Lamp Co.).—An article to be plated, such as one of nickel, iron or molybdenum, is immersed in a fused bath containing alkali halide compounds, such as potassium chloride and potassium fluoride, together with an ionised tantalum compound such as potassium-tantalum fluoride and tantalum oxide, and tantalum is deposited as a continuous adherent coating by use of a c. d. of 1—10amp./sq.dm. (9-91amp./sq.ft. E. B. S.). *C. A.* **28**, 420 (1934).

Copper electrolysis. E. VUIGNER. *J. four élec.* **42**, 363 (1933).—A general discussion of the acid sulfate bath. Maximum efficiency and purity of the cathode are obtained by using: anodes at least 99.25% pure; highly concentrated free acid, about 150g./l.; temperature at least 40°C.; pure starting sheets and absence of colloidal addition agents or chlorides.
C. A. **28**, 415 (1934). C. F. BONILLA.

The art of cadmium plating. F. PIETRAFESA and E. LOTTI. *Met. ital.* **25**, 167 (1933).—The best conditions for cadmium-plating have been found to be: c. d. 2amps./sq.dm. (18 amps./sq.ft.E.B.S.), temperature 20°C. Bath composition is: 0.75 *N* cadmium as (as $Na_2Cd(CN)_4$); 1 *N* free sodium cyanide; 0.75 *N* sodium chloride; plus a small amount of certain organic addition agents to improve the quality of the deposits.
C. A. **28**, 416 (1934). A. W. CONTIERI.

Electroplating cadmium. U. S. Patent No. 1,931,854. October 24, 1933. R. TEATS and R. L. HASCHE. (to American Smelting and Refining Co.).—Insoluble anodes are used with a cadmium sulfate electrolyte containing a small proportion of saponin. *C. A.* **28,** 420 (1934).

Tin plating. British patent No. 395,377. July 14, 1933. The Roessler & Hasslacher Chemical Co.—In the use of tin-plating baths containing 0.25-0.65 mole of alkali stannate per litre and 1.6 moles of caustic alkali per mole of stannate plus an additional amount of caustic alkali of 0.2-0.4 mole per litre, the alkali content is corrected when it has become too high by the addition of (a preferably weak) acid, e. g., acetic acid, and, at approximately the same time, an oxidising agent, e. g., hydrogen peroxide, alkali metal peroxide, permanganate, persulfate or perborate. Thymolphthalein is preferably used as indicator in the determination of the caustic alkali which includes that set free by hydrolysis of the stannate. The plating temperature is preferably 60-80°C. and the c. d. 10-100amp./sq.ft. at the cathode, and up to 20amp./sq.ft. at the anode. *C. A.* **28.** 92 (1934).

Plated zinc sheets. British patent No. 395,585. July 20, 1933. F. JORDAN.—A zinc alloy containing 98-99% zinc and 2-1% aluminum is used for producing compound sheets of aluminum and the alloy. The aluminum sheet is rolled onto the zinc alloy sheet while white-heated to a higher temperature than that of the zinc alloy sheet, both temperatures being within the limits 180-450°C. The plated sheets may be rolled out into metal foil. The aluminum sheet may be made of an aluminum-silver alloy. The sheets may be plated on one or both sides, and after plating may be heated to 150-300°C. *C. A.* **28,** 92 (1934).

Electrodeposition of nickel. British patent No. 395,979. July 27, 1933. F. von WURSTEMBERGER.—Iron or steel, before plating with nickel, is anodically treated in sulfuric acid for passivation and slight etching. After brief rinsing it is plated in a bath containing a nickel salt, a conducting salt, e. g. Magnesium sulfate or sodium sulfate, a buffer acid, e. g., boric acid, and a tartrate, e. g. sodium-potassium tartrate, no adverse effects being produced with such a bath by iron compounds unavoidably introduced by the preliminary treatment.. Detailed examples are given. *C. A.* **28,** 419 (1934).

Nickel anodes. ERICH BECKER. *Metallbörse* **22,** 1293-4, 1325-6 (1932).—A review. *C. A.* **28,** 47 (1934). ALLEN S. SMITH.

The influence of the basis metal, in particular nickel, upon the throwing power of the chrome-plating bath. J. KORPIUM and ERNST VOGEL. *Oberflächentech.* **10,** 243 (1933).—The inherent low throwing power of the chromium-plating bath has been remedied in various ways which are briefly reviewed. A method for determining the throwing power is described and results are given for the improvement which is obtainable through the basis metal. *C. A.* **28,** 416 (1934). M. H.

Measurement of the throwing power of chromium-plating baths. A. ONITCHENKO. *Z. Elektrochem.* **39,** 815 (1933).—A right-angled cathode is used, with one side perpendicular and the other parallel to the anode. Removable strips are held in a 3.5mm. frame which takes the main portion of the current. The quantitative effect of sulfuric acid, c. d., and temperature on the throwing power and current efficiency of chromium baths are investigated. *C. A.* **28,** 47 (1934).

Chromium-plating of ferrous metals. U. S. patent No. 1,931,704. October 24, 1933. S. C. MOORE and F. E. BOWKER. (to Dura Co.).—Articles of ferrous metals are successively coated with a metal such as cadmium which is electronegative to iron, with nickel and with chromium. Copper may also be used. *C. A.* **28,** 420 (1934).

Electrolytic deposits on aluminum. H. KRAUSE. *Mitt. Forschungsinst. Probieramt. Edelmetalle* **7,** 87 (1933).—The procedure of nickel plating aluminum and aluminum alloys is discussed. The metal must first be degreased in a 90°C. solution of 7.5-22.5g. each of trisodium phosphate and sodium carbonate per litre and, after rinsing in cold water, immersed in a 5% bath of hydrofluoric acid. The surface is then roughened in a sand blast or, better, in a pickling bath, to make the deposit adhere well. The nickel-plating solution consists of 150g. nickel sulfate ($NiSO_4$), 75g. magnesium sulfate ($MgSO_4$), 15g. ammonium chloride and 15g. boric acid per litre; temperature 35°C.; c. d. 1.5 amp./sq.dm. (14amp./sq.ft.E.B.S.), and pH= 5.8—6.0. A minimum thickness of 0.0125mm. (5/10,000 inch E.B.S.) is recommended. Any other metal may be deposited on the nickel; zinc and chromium may be deposited directly on aluminum. Nickel-plated aluminum is not suitable for further working; heat treatment (1.5 hours at 130°C., then 3 hours at 315°C.) improves its behavior especially for articles which are exposed to high temperatures; gradually increase to 315°C. and hold this temperature for several hours. *C. A.* **28,** 415 (1934). M. H.

Electroplating on aluminum and its alloys. British patent No. 394,637. June 29, 1933. SIEMENS and HALSKE, A. G. Addition to patent No. 385,067 (*C. A.* **27,** 5257 (1933.)).—The process of 385,067 is modified by producing the initial oxide coating by the use of the a.c. in an alkali metal carbonate bath of low concentration free from chloride. The bath may contain 20-80g./l. sodium carbonate. The coated articles are subsequently treated as cathodes in a degreasing bath containing copper and zinc to effect first, reduction of the coating and then deposition of brass. They are then rinsed and plated with the desired metal. *C. A.* **28,** 420 (1934).

Utilisation of electrochemically produced oxide layers on aluminum (Eloxal process) **for metal coloration and for electrolytic coatings.** G. BUCHNER. *Oberflächentech,* **10,** 233 (1933).—A table is given showing the different colors which can be obtained by electrochemically produced oxide layers on aluminum, silumin and lautal; gray, yellow, white and bluish tones can be produced by definite electrolyte and oxidation conditions. The oxide layers are good absorbers for fat-soluble and water-soluble organic colors, especially tar derivatives; the article is suspended as anode in different organic solutions, a few of which are described. Either a.c. or d.c. may be used; special effects may be obtained by polarised high-frequency current, that is, an a.c. with a superimposed d.c. of such intensity that the resulting current is only on one side of the zero line. The oxidation process is a complicated chemical, electrochemical and electrical process in which aluminum hydroxide is formed on the surface.

C. A. **28,** 416 (1934). M. HARTENHEIM.

Coating aluminum. British patent No. 396,204. August 3, 1933. Aluminum Colors, Inc.—White coatings are produced on aluminum (alloy) articles by forming an adherent oxide coating thereon by anodic treatment in

a sulfuric acid or oxalic acid electrolyte and then, without the application of external electrical energy, removing the colored constituents of the coating with a suitable reagent, e. g., sulfuric acid and (or) nitric acid or hydrofluoric acid. Cf. *C. A.* **27,** 2887 (1933). *C. A.* **28,** 420 (1934).

Coating aluminum. British patent No. 396,743. August 8, 1933. E. WINDSOR-BOWEN.—In the anodic oxidation of aluminum (alloys) by d.c. or a.c., a bath containing sulfuric acid and sodium sulfate in the absence of chloride-ions is used. An oxidising agent, e. g., sodium or potassium nitrate, persulfate or perborate, may be added in proportion of 1% or less. A water-dispersible colloid may also be added, e. g., 25 parts of a 1% dispersion of gum to 75 parts of electrolyte. Cf. *C. A.* **27,** 5257 (1933). *C. A.* **28,** 420 (1934).

Coating metals. British patent No. 396,746. August 4, 1933. H. C. HALL.—A protective coating is formed on non-ferrous metals and alloys, particularly high aluminum alloys, by immersion in a hot solution of phosphoric acid in ethylene glycol, glycerol and (or) trimethylene glycol. The coated articles are washed, preferably in dilute alkali solution, and may then be stoved in air or oil a few hours at 100-200°C. The coating may be used as a base for paint, varnish or enamel. *C. A.* **28,** 461 (1934).

Electrolytic surface treatment of aluminum and its alloys. British patent No. 395,390. July 6, 1933. C. H. R. GOWER and E. WINDSOR-BOWEN.—The metals are treated anodically in a bath containing an aluminum salt as an initial component. A suitable electrolyte for a soft coating is obtained by mixing 160 litres of dilute sulfuric acid, containing 2.5 parts acid to 2 parts water, with 20 liters of a 20% aluminum sulfate solution, a lower strength being used for a hard coating. The voltage may be 80-100, and the temperature 60-65°F. A small quantity, e. g. 1%, of a water-dispersible albumenoid colloid or a carbohydrate or polysaccharide, e. g., dextrin, gum tragacanth, gum acacia, agar, etc., is added for soft coatings. Organic dyes or metallic salts imparting color to the coatings may be added or the coated articles subjected to solutions thereof. *C. A.* **28,** 50 (1934).

Coating aluminum or its alloys. German patent No. 583,023. August 26, 1933. SIEMENS and HALSKE, A. G. (N. Budiloff and A. Jenny, inventors).—Noble-metal coatings are produced on aluminum or its alloys by superficially oxidising the aluminum or alloy in known manner, and applying to the oxidised surface a solid or dissolved noble-metal compound, e. g., silver nitrate, which is then decomposed by heat. A reducing agent which leaves no residue, e. g., sugar or alcohol, may be applied with the metal compound. *C. A.* **28,** 92 (1934).

Aluminum. French patent No. 749,608. July 27, 1933. Aluminum, Ltd.—The hardness of the surface of aluminum or aluminum alloys is increased by causing a diffusion of magnesium into the surface. The surface is covered with finely divided magnesium and heated to above 250°C. French patent No. 749,609. Aluminum-magnesium alloys containing 5-16% magnesium have higher resistance to corrosion if the iron impurity is kept below 0.1% and below the amount of silicon. *C. A.* **28,** 456 (1934).

Coating metals. British patent No. 395,491. July 20, 1933. Verein für die Probier-und Forschungsanstalt für Edelmetalle.—An invisible protective coating is formed on the surface of silver (alloys), by treating with a

solution containing chromic acid. Cuprammonium chloride, a persulfate, or both may be added. The metal is preferably first degreased and then immersed in the solution, washed and dried. *C. A.* **28,** 92 (1934).

Electrodeposition of metals. British patent No. 396,191. August 3, 1933. J. WINKLER, Jr.—In the deposition of two or more metals from a bath, direct voltages appropriate to each metal are applied in alternation for periods so short that the deposited layers have the characteristics of an alloy. 50-150 complete cycles per minute may be used. In an example, an alloy containing gold, 69.5, copper, 28.2, and nickel 2.3% is deposited in a plating bath prepared by treatment of an anode containing gold 50.0, copper 42.5, and nickel 7.5% in a bath containing sodium pyrophosphate 20, sodium citrate 20, potassium cyanide 8 and water 1,000 parts, an auxiliary cathode having half the surface of the anode being used and, when the bath contains 6g/l. of dissolved metal, replaced by the article to be plated. Separate anodes of gold, copper and nickel may be used. *C. A.* **28,** 419 (1934).

The rate of growth of cathodic deposits. A. GLAZUNOV and J. JANAUŠEK. *Chemie & industrie, Special No.* 739 (June, 1933).—By following the electrolysis under the microscope, it was observed that there are two rates of linear crystallisation during the deposition of the metal on the cathode, that of growth perpendicular to the cathode and that of growth parallel to the cathode. *C. A.* **28,** 416 (1934). A. PAPINEAU-COUTURE.

Relationship between the direction of growth of the cathode deposit and of the direction of the lines of electric force. A. GLAZUNOV and O. RADA. *Chemie & industrie, Special No.* 736 (June, 1933).—By using shallow electrolytic tanks, 3-5mm. deep, in which were placed variously shaped obstacles, dendritic shaped cathodic deposits were obtained which followed the lines of electric force.

C. A. **28,** 416 (1934). A PAPINEAU-COUTURE.

Preparation and etching of galvanised wire for metallographic examination. LADISLAV HAJDA and STÉPHAN POPOFE. *Chemie & industrie, Special No.* 700 (June, 1933).—The following treatment was found to give very distinct structures under the microscope: mounting of sample in ebonite; polishing with magnesium oxide suspended in denatured alcohol, etching by means of a diluted Kourbatoff reagent (1 volume of 4% nitric acid in Ac_2O) is mixed just prior to use with 10 volumes of a mixture of equal volumes of methyl alcohol, ethyl alcohol and iso-amyl alcohol.

C. A. **28,** 441 (1934). A. PAPINEAU-COUTURE.

Determining the thickness of electrolytic deposits. MARCEL BALLAY. *Aciers spéciaux,* **8,** 240 (1933).—The thickness of an electrodeposit can be determined by means of micrographic examination, but more exactly by measuring the time it takes to dissolve the electrolytic deposit, and from this the thickness of the plate is determined. Many well-known solutions for dissolving each electrodeposited metal are given and discussed. Porosity, corrosion, hardness and brittleness tests, such as are in commerical use in France, are enumerated. *C. A.* **28,** 47 (1934).

Electrolytic reproduction of plate surfaces. U. S. patent No. 1,930,826. October 17, 1933. H. B. SCOTT and C. C. CONLEY (to National Cash Register Co.).—For duplicating the surface of an intaglio grained master plate, to form a graining plate, the back of the master plate is coated with a

plating resistant; a film of nickel is electroplated on the face of the master plate; the master plate is anodically treated in a caustic solution and rinsed; a corticular layer of nickel is electroplated on the nickeled face of the master plate; alternate and successive layers of superposed copper and nickel are electroplated on the exposed side of the corticular layer to form a backing for it, and the corticular layer with its superposed backing layers is stripped as a unit from the master plate to form a "mother" or reverse master plate from which, by a described and generally similar procedure, a graining plate is formed to which a backing layer of lead is applied by electroplating.

C. A. **28,** 50 (1934).

Electrolytic production of metal sheet. British patent No. 395,002. July 7, 1933. ANACONDA SALES CO.—Metal is continuously deposited on a rotating cathode drum and is stripped as a foil. To build up the foil by further electrodeposition on one face only it is passed over a roller, down one face of a guide serving as cathode connection, up the other face and over a roller to successive rollers and guides, travelling in a series of vertical loops between soluble anodes without ever passing beneath the anodes. Apparatus is described. *C. A.* **28,** 50 (1934).

Mechanism of corrosion of iron in sodium chloride solution—effect on the potential of the iron of adding organic substances to the brine. E. G. R. ARDAGH, R. M. B. ROOME and H. W. OWENS. *Ind. Eng. Chem.* **25,** 1116 (1933).—A dependable procedure is described by which reproducible measurements of the potential of an iron electrode in a brine can be obtained. This procedure is employed in making a survey of the inhibiting effect on the corrosion of iron in brine of different classes of organic compounds. Certain classes of organic compounds are shown to have a strong tendency to inhibit the corrosion of iron in brine. The mechanism of this inhibiting action is partially elucidated. *C. A.* **28, 86** (1934). M. E. HAAS.

Corrosion-time relationship of iron. R. F. PASSANO. *Ind. Eng. Chem.* **25,** 1247 (1933).—Passano thinks that the use of calculated rates of corrosion is likely to be misleading except when the corrosion-time relationship is linear or when one has a knowledge of the nature of the corrosion-time relationship existing under the particular conditions, whatever they may be. Various types of corrosion are presented graphically in their relationship to time. Eighteen references are given. *C. A.* **28,** 86 (1934).

Protecting iron against rust. German patent No. 583,349. September 1, 1933. N. V. Maatschappij tot exploitatie van de Parker Octrooien "Parker Rust Proof." Iron articles, after treatment in known manner in a phosphate bath containing a compound of a less electropositive metal, e. g., copper, are treated with a chromate solution or with a solution containing 1-3g of free chromic acid per litre. *C. A.* **28,** 92 (1934).

Protecting iron and steel against corrosion. German patent No. 584,411. September 20, 1933. A. PACZ.—A resistant coating is produced on articles of iron and steel by treating them for a short time, e. g., 15 minutes, preferably at a raised temperature, with a dilute bath containing phosphoric acid (or a primary phosphate of a heavy metal) and a soluble compound of MoO_3, e. g., ammonium molybdate. The bath may also contain an acid fluoride or other salt capable of liberating MoO_3 from the soluble molybdenum compound. *C. A.* **28,** 93 (1934).

Current density in electrolytic baths. V. ALEKSEEVSKII. *J. Chem. Ind.* (Moscow) 1933, No. 6, p. 36.—Calculations are given to show the effect of design of electrodes on current density.

C. A. **28,** 46 (1934).H. M. LEICESTER.

ABSTRACTS FROM THE EDUCATIONAL COMMITTEE

T. F. SLATTERY, Chairman.

Chromium Plating from a Cold Bath. L. Richard.

Galvano-Nov. 1933, page 18.

The use of the cold bath for chromium plating is spreading. Those who are adopting the process will find that they must serve an apprenticeship in its use, in spite of all claims of simplicity and ease of operation. A brief survey may assist at this stage.

In maintaining the bath, the sulphuric acid content is low and must be kept low. The plater cannot add this acid as freely as with the warm bath. Trouble is encountered if trivalent chromium concentration falls too low. Working the bath with a small anode and a large cathode area remedies this by reduction of chromic acid. This is just opposite to warm bath usage. Weekly additions of chromic acid to maintain the metal content of the bath are, of course, necessary in either process.

The temperature should not fall below 13°C (55°F) and should best be kept around 15°C (59°F). Lead anodes are best. They should be removed without rinsing each evening and replaced the following morning without brushing. They should be cleaned each week by brushing.

Close regulation of current is essential, more so than with the warm bath. The sulphate ion concentration, on which depends the plating range; the temperature, which affects strongly the ease of reduction of the chromium to a metallic state; and the applied voltage are the three factors that must be balanced to give the best results. The warmer the bath and the stronger it is in sulphuric acid, the higher the voltage necessary.

A gradual building up of the voltage after placing the wax in the bath is recommended. Stringing small pieces on wires is more practical than with the warm bath, but large pieces must be carefully attached. Because the solution drag-out is greater than with the cold bath, more careful rinsing is required.

In conclusion, the author does not recommend a change from warm baths where they are already in use, but states that new installations may be most satisfactory. C. T. THOMAS.

Rhodium plating. Osvaldo Macchia.

Ind. Meccanica **15,** 621-2 (1933).

A brief review of rhodium in electroplating, covering the published researches and the proposed baths. F. D. ROSSINI.

The technic of parkerizing and bonderizing. O. Macchia, F. Moreno, and G. Oddone.

Ind. Meccanica **15,** 866-8 (1933).

A detailed discussion of the technic, methods of operation, and precautions which must be followed in securing optimum results in parkerizing and bonderizing. F. D. ROSSINI.

Chromium plating in the cold. O. Macchia and D. Raffaelli. Ind. Meccanica **15**, 793-5 (1933).

A discussion of the conditions for plating chromium at 30 to 50°C (86 to 122°F) as contrasted with that at 16 to 20°C (61 to 68°F). The authors conclude that plating in the cold is entirely practicable and possesses the following advantages over the use of heated baths: the heating apparatus and its expense of operation are eliminated; a smaller current density may be used, in consequence of which a smaller investment in the generating plant and its operation is required; and the apparatus required for ventilation is reduced to a minimum. F. D. ROSSINI.

Kenneth E. Burgess, formerly Technical Director of Zapon Company, more recently in charge of the Lacquer Division of Van Schaack Bros. Chemical Works, is now, in consequence of the transfer of that Division to Ault & Wiborg Corporation, a member of the technical staff of the latter organization.

Dr. Burgess, after taking degrees at the University of Toronto, started his professional career with DuPont and Atlas Powder Company in high explosive work, but has devoted sixteen years to the lacquer field. As a member of the Ault & Wiborg Corporation, he will devote his time to sales service work on behalf of customers.

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RHODIUM

I. **Minerals.**—(a) Rhodium is found in native platinum, of which it is a subordinate constituent; osmiridium, platiniridium, and alurite (q.v.) contain small quantities of the metal.

(b) Rhodium-gold, containing as much as 43 per cent, of rhodium, has been found in Mexico; native gold occasionally carries a little rhodium.

(c) It has been detected in minute quantities in the Sudbury nickel-copper ores.

II. **Properties and Compounds.**—(a) The metal is white, ductile, and malleable at a red heat. It melts at about 2000°, and has a sp. gr. of 12.1. When precipitated from solution it is slightly soluble in nitric or hydrochloric acid in contact with air, and soluble in hot strong sulphuric acid or aqua regia. The compact or ignited metal is insoluble in all acids; if alloyed with relatively large quantities of lead, copper, bismuth or platinum it is soluble in aqua regia. The metal is dissolved by fused bisulphate, alkaline hydroxide and nitrate, peroxide, or sodium chloride in a current of chlorine.

(b) Sulphides.—Hydrogen sulphide produces a dark brown precipitate of hydrosulphide, $Rh(SH)_3$, complete precipitation requiring prolonged treatment of the boiling hot solution. The precipitate is insoluble in ammonium sulphide, soluble in aqua regia or hot strong nitric acid. The black sesquisulphide, Rh_2S_3, is obtained by heating the trichloride in a current of hydrogen sulphide.

(c) The trichloride, $RhCl_3$, may be prepared by heating the finely divided metal in a chlorine current. It is red, insoluble in water, and of much less practical importance than its derivative described under (d).

(d) Sodium chlororhodite, Na_3RhCl_6, is obtained anhydrous when the metal mixed with sodium chloride is heated in chlorine. It is insoluble in alcohol. On dissolving the mass in water a deep red solution is obtained, which contains the hydrate $Na_3RhCl_6.9H_2O$. Ammonium chlororhodite is soluble in water and in dilute ammonium chloride solution, but insoluble in a saturated solution of the latter salt.

(e) Rhodium sulphate, $Rh_2(SO_4)_3$, is formed by the action of fused bisulphate on the metal. The yellow solution of the salt turns red on the addition of hydrochloric acid. Rhodium alums have been prepared.

(f) Oxides.—When the metal is fused with alkaline hydroxide and nitrate the sesquioxide, Rh_2O_3, is obtained; this, by repeated fusion, is converted into dioxide, RhO_2. Both are grey powders, insoluble in acids. The sesquioxide is also obtained by adding excess of sodium carbonate to a solution of alkali chlororhodite, evaporating to dryness, igniting, and extracting the residue with water and hydrochloric acid.

(g) The trihydroxide, $Rh(OH)_3$, is a black precipitate, formed when alcohol is added drop by drop to the cold solution of rhodium chloride containing excess of caustic alkali.

(h) Chloropentamminerhodium dichloride, $(RhCl(NH_3)_5Cl_2$, also known as Claus's salt, crystallises out in small, pale yellow crystals on evaporating and cooling an ammoniacal chloride solution. It is very stable, and dissolves in strong sulphuric acid without decomposition, but is reduced to metal by zinc. The ammoniacal rhodium compounds closely resemble those of cobalt.

III. **Quantitative Separation.**—(a) Separation from lead.—The nitric acid solution is precipitated with sulphuric acid added very slowly whilst stirring; the liquid is heated to 100°, left to cool, and filtered. The precipitate is free from rhodium. The filtrate is evaporated to dryness, taken up with water, and again filtered; if the slight residue of lead sulphate shows a pink or buff colour it is washed on the filter with a saturated solution of ammonium carbonate, which extracts all the rhodium. The filtrate is evaporated to one-half its bulk, the lead carbonate filtered off, and the filtrate acidified with hydrochloric acid; the combined filtrates are precipitated with zinc or formic acid.

(b) Separation from Silver.—(1) The boiling nitrate or sulphate solution is precipitated, drop by drop, with very dilute hydrochloric acid until no further precipitate forms. The silver chloride is allowed to settle, filtered off, and washed as usual. The rhodium in the filtrate is precipitated with zinc or formic acid.

(2) The precipitated and ignited metals are digested with dilute nitric acid, silver dissolving. Compact silver containing rhodium is treated in the same manner; the filtrate containing silver may have to be tested for rhodium according to (1).

(c) Separation from Gold.—(1) See Ruthenium, III, (b).

(2) The precipitated and ignited metals are digested with dilute aqua regia; the gold is dissolved.

(3) Rhodium-gold, if high in rhodium, is melted with lead, and the button dissolved in nitric acid; the lead nitrate solution is examined for rhodium according to (a). The residue is dissolved in aqua regia, the excess of acid evaporated, the residue taken up in water, and the noble metals precipitated with formic acid. The precipitate is strongly ignited and the gold extracted therefrom according to (2).

(d) Separation from Ruthenium.—See Ruthenium,III, (c).

(e) Separation from Palladium.—(1) The metals mixed with sodium chloride are heated in a current of chlorine, the melt leached with water, the solution heated to expel chlorine, and precipitated with mercuric cyanide (Palladium, III. (j).) The filtrate containing rhodium is evaporated to dryness and the residue heated in hydrogen or coal-gas.

(2) The solution is acidified with a few drops of hydrochloric acid and the palladium precipitated with dimethylglyoxime at boiling heat. The excess of reagent in the filtrate is destroyed by means of hydrochloric acid and sodium chlorate, the chlorine boiled off, and the solution digested with magnesium till colourless; the precipitated rhodium is washed with 5 per cent. sulphuric acid followed by water, the filter dried and ashed separately, the metal added, and the whole ignited in hydrogen.

(3) The roated sulphides are digested hot with strong hydrochloric acid, or the precipitated ignited metals are treated with hot concentrated nitric acid; in both cases rhodium remains insoluble.

(4) See Palladium, III, (j) (2).

(f) Separation from Osmium.—See Osmium, III, (a) and (d).

(g) Separation from Iridium.—(1) The separation of the mixed metals by fusion with bisulphate is unreliable.

(2) The solution of the mixed chlorides is treated with ammonium or potassium chloride with the same precautions as in the separation of rhodium from platinum, (h) (2). Iridium is precipitated as chloriridate.

(3) The dry mixed sodium chlororhodite and chloriridate are extracted with strong alcohol, iridium dissolving (h) (3).

(4) See Iridium, III, (h).

(h) Separation from Platinum.—(1) The precipitated and ignited (unalloyed) metals are digested with dilute aqua

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regia (1: 4 to 5 water) at 50°, platinum dissolving. The extraction is continued, using fresh acid if necessary, until the liquid remains colourless. The residual rhodium is ignited in hydrogen. The solution of the mixed chlorides may be evaporated to dryness with excess of sodium carbonate, the residue extracted with water and acid, and the insoluble rhodium sesquioxide plus platinum separated in the same manner.

(2) The solution containing sodium chlororhodite and chloroplatinate is precipitated with potassium or ammonium chloride, when platinum is thrown down; the solution must not be more than one-half saturated with the alkaline chloride, as otherwise part of the rhodium is also precipitated. The washing is conducted with one volume of saturated chloride solution to three of water, using no more than is strictly necessary on account of the slight solubility of the chloroplatinate.

(3) The same solution as in (2) is evaporated to dryness and the residue extracted with alcohol (sp.gr.0.83): rhodium remains insoluble.

(4) The separation of the finely divided metals by fusion with bisulphate does not give good results unless the amount of rhodium is very small. The fusion should be repeated until the melt after ten minutes' fusion does not acquire a yellow color. The dissolved rhodium is precipitated with formic acid, zinc, or magnesium.

IV. **Gravimetric Determination.** — (a) Rhodium is weighed in the metallic state after ignition in hydrogen or coal-gas; the metal is precipitated by means of magnesium or zinc.[1] In the first case the precipitate is washed with 5 per cent. sulphuric acid followed by water; in the second, it is digested with dilute nitric acid at a moderate heat for a few minutes before filtration. The metal may also be obtained by boiling its solutions with ammonium acetate and formic acid under reflux (see Platinum, IV, (e)).

(b) Solutions containing chlororhodite or rhodium sulphate may be evaporated to dryness with excess of sodium carbonate, the residue ignited, extracted with water and washed with dilute hydrochloric acid, the residual sesquioxide strongly ignited in hydrogen, and weighed as metal.

V. **Detection and Determination in Ores.**—(a) Detection.—(1) The silver bead from the dry assay of an ore containing rhodium generally has a bluish colour. The bead, or

the lead button obtained by melting the substances under investigation with granulated lead, is dissolved in dilute nitric acid (1: 10), the residue strongly ignited in coal-gas, and extracted with dilute aqua regia. The residue from the last treatment is fused with bisulphate in a silica crucible and the yellow solution from the melt filtered if necessary; the colour turns pink on addition of a little hydrochloric acid. Addition of caustic alkali and alcohol causes formation of a black precipitate (II, (g)). The reactions of rhodium are much less pronounced than those of the other platinum metals; however, its solubility in aqua regia, solubility in bisulphate, the red colour of sodium chlororhodite, and the insolubility of the latter in alcohol are sufficiently characteristic to prove its presence.

(2) See Platinum, VI, (c).

(b) Determination.—(1) In sulphide ores. See Platinum, VII, (b) (3).

(2) In rhodium-gold. See III, (c) (3).

(3) In platinum ore and osmiridium. See Platinum, VIII.; Osmium, VIII.

[1]For electrolytic determination see Langness, Journ. Amer. Chem. Soc., 1907, **29**, 469.

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PROTECTION OF WORKERS EXPOSED TO CHROMIUM AND ITS COMPOUNDS

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INTRODUCTION

THE increasingly diverse and numerous industrial applications of chromium and its compounds have renewed interest in the troublesome, although not serious, effects of the action on the skin of exposed workers, and in studies to determine any harmful results following introduction into the body. Efforts have been directed particularly toward methods of protection for workers so exposed.

TOXICITY

All compounds of chromium are not equally toxic. Chromic acid and the chrome salts, especially potassium and sodium bichromate are far more toxic than the neutral salts and oxide. The bichromates were found by Pander[1] to be 100 times more poisonous than the soluble chromium oxide compounds, while chrome ironstone, native ferrous chromite ($FE\ Cr_2\ O_4$) and pure chromium are non-poisonous. Kundel[1] is of the opinion that the irritating effect of chromium oxide compounds is attributable to traces of oxidation into chromic acid. Lewin,[1] on the other hand, declares, in a cautionary notice for chrome workers generally, that all chromium compounds, and therefore all the dyes made from them, are poisonous.

Chrome yellow, orange, green, and red, it should be remembered, are lead chromates, and the chief danger lies in the lead content, which may cause chronic lead poisoning. These compounds may be known as lemon royal, Cologne and Paris yellow, or lead yellow.

MODES OF CONTACT

Chromic acid and its compounds are conveyed to the skin and mucous membranes:

First, through handling the dry material itself, either as crystals or in the form of a fine powder.

Second, through contact with solutions of the material.

Third, through exposure to the atmosphere containing the material in the form of a vapor, spray, or mist, or as a dust, in varying amounts, depending upon the technique practised.

EFFECTS ON WORKERS

The action of chromic acid and its compounds affects particularly the skin and mucous membranes. The more common

manifestations may be grouped under the following three headings:

1. Dermatitis. This may occur as a diffuse inflammation or assume a vesicular or papular form. Its location is chiefly on the fingers, hands, face, and occasionally on the chest and feet. Trumper[2] describes a typical chrome eczema which attacks the hands, arms, face and neck of the worker. He states that the cellular tissue of the face may be swollen to such an extent as to cause temporary blindness by occlusion of the orbit. The initial attack may occur during the first day in the chrome shop or may not occur until after several years. Carozzi[3] also observed an eczema with œdema and pain and reports cases of septic granuloma among the sequelæ of this irritation of the skin.

2. "Chrome holes"—*single or multiple ulcerations of the skin and subcutaneous tissues.* These ulcerations vary in size from that of a pinhead to approximately 10 millimetres in diameter. The ulcer develops slowly without pain, practically always at the site of a previous crack or injury in the skin. It may penetrate very deeply with loss of tissue and infiltration, and it heals with difficulty. According to Prosser White,[4] these ulcers always leave scars which are usually quite distinctive.

Secondary infections are said to result sometimes from chrome lesions on the skin, but it is likely that the bordering tissues become infected, rather than the local injury, owing to the bactericidal properties of the chromium compound retained in the chrome holes. However, White[4] attributes the itching, smarting, and pain which workers complain of, especially at night, to erosion of the tissues by the "trypsin" liberated during the undisturbed growth of pyogenic organisms. He also believes that the septic granuloma results from a low and slow form of inflammation or irritation, due to the feeble but repeated activity of infecting organisms.

3. Irritation of the respiratory mucous membranes, with nasal ulceration and perforation of the nasal septum. The inflammation of the respiratory mucous membranes is limited usually to the nasal passages. The nasal septum is exposed to dusts and fumes through inhalation, becomes ulcerated, and finally perforation occurs at a point where the blood supply of the tissues is scanty. The erosion of the septum takes place

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slowly and those affected are unaware of any injury. There may occur a slight feeling of soreness or irritation of the nose and the patient may complain of nose bleeding, but seldom is there much blood lost. No deformity of the outward appearance of the nose takes place, nor is the breathing interrupted. The entire process may be complete in as short a time as one week. The perforation is permanent. Although the nose is the usual site of attack, other mucous membranes may be affected. Ulcers of the tonsils, palate and larynx have been reported.

Contrary to what might be expected, the eyes are rarely seriously affected. Tattooing of the cornea following inflammation of the superficial layers of the cornea (keratitis) may be caused by the formation of the insoluble oxide of chromium from chromic acid under the action of light, and may result in a diminution of vision.

Systemic disease from chromium rarely occurs as a result of industrial exposure. Vomiting was noticed by Trumper[5] in 4 out of 160 persons suffering ill effects from chromium plating. The vomiting occurred suddenly without any previous malaise and came on immediately after taking food. Joules,[6] in reporting a case of asthma in a chrome worker, calls attention to cases of asthma reported by two French observers, Drs. Delpech and Hillairet, as long ago as 1869, and also Sir Thomas Legge in 1899. Carozzi,[3] although noting that others speak of an action by chromates either on the respiratory or digestive tract or on the kidney tubuli, finds it somewhat difficult to attribute to chromates any of the bronchitis, asthma, albuminuria, or nephritis observed from time to time among these workmen.

Dr. Alice Hamilton[7] believes the lesions are local always and never develop into skin cancer and offers in confirmation the British factory inspector's report in which no case of chrome ulcer undergoing carcinomatous degeneration has ever been reported, nor any case of constitutional trouble.

PREVENTATIVE MEASURES

The harmful effects from chromium compounds can be wholly eliminated or reduced to a minimum so that the risk becomes negligible. The responsibility is equally divided between the management and the worker.

PLANT HYGIENE

1. Segregation—In order that as few workers as possible will be exposed to chromium compounds, all operations involving

their use should be localized in departments completely separated from other departments of the plant. Workers from other departments should be prohibited from coming in contact with chrome operations unless they take the same precautions as chrome workers.

2. Ventilation—Reliance cannot be placed on natural ventilation. Efficient local exhaust ventilation, as near as possible to the source of the hazard, is essential. Among the several notable studies conducted in industrial plants on the quantitative exposure to chromium compounds and methods of control is a recent study of the health hazards in chromium plating by the United States Public Health Service.[8] Drawing the air laterally across the top of the plating tanks into ducts from one to two inches wide and extending fully along one or more sides of the tanks is recommended as the most efficient method of ventilation. To be effective, the duct should not be required to draw the air laterally for a distance of more than 18 inches. This report further recommends that the level of the plating solution should be at least eight inches below the top of the tank and the duct should be at the top of the tank. For effective ventilation, it is necessary to have an air velocity at the duct of about 2,000 feet per minute.

Wherever the material is used in crystal or powder form in operations, such as mixing, sifting, drying, grinding, emptying, and packing, hermetically sealed apparatus with efficient exhaust ventilation should be employed, if at all practicable. The material should be handled mechanically rather than by hand. Chromate in solution may be delivered from the vats to the tanks through pipe lines operated by a pump.

Workers should be prohibited from continuing operations after the ventilating system fails to operate properly or breaks down, and should not resume work until efficient exhaust ventilation has been restored.

3. Plant Housekeeping—Strict cleanliness of work places, floors, apparatus, and tools is an important feature in preventive work. Articles should be transferred from vat to tank and from tank to racks with a minimum of dripping. It has been recommended that the floor in the vicinity of the processes be covered with sawdust and that this be renewed daily. Soiled work places should be cleaned frequently. The production of dust must be controlled.

1. Protective Clothing—Protective clothing is not always practicable and, in many instances, may defeat the purpose for which it was intended. Rubber gloves, apron, and boots are sometimes recommended, but it so happens that, in raising objects to a rack, the solution runs off the gloves onto the arms and, when the hands are lowered, the solution finds its way inside of the gloves. The solution likewise may drip from a rubber apron into the boots. Thus, instead of such clothing protecting the skin, the gloves and boots become veritable compresses. The use of long India rubber gloves, maintained in good condition, so arranged as to prevent solutions and dusts from reaching the inside of the glove, is undoubtedly of value where contamination with solutions or powdered material is inevitable. Hip rubber boots, fitted snugly to the thighs, are also valuable precautionary measures. Washable working clothes or overalls, kept in good repair, should be worn, and provision for washing the hands frequently in running water or a neutralizing solution should be made convenient to the working places. The solutions usually recommended are: bisulphite of soda, salt of bismuth or of zinc or calcium. The daily shower bath is essential. A complete change of clothing upon quitting work at night is recommended. Clothing which becomes saturated with chrome solutions should be carefully washed and dried.

2. Protective Ointments—A variety of ointments for the purpose of protecting the skin against chromium compounds has been recommended to be applied before commencing work. Petrolatum (vaseline) and lanolin have been recommended, either alone or combined. Among others, one consists of mineral vaseline (16 parts), soft paraffin (2 parts) and cyllin (1 part), and still another of soft paraffin (3 parts), lanolin (1 part), with the addition of 10 to 15 drops of 90 per cent. carbolic acid. A procedure found practicable in the prevention of irritating substances used in industry is as follows: Each worker, at the beginning of each shift, is required to wash his hands and arms with soap and warm water and rub castor oil, or lanolin and castor oil (equal parts) into the pores of hands, arms and face. If the skin feels too greasy after this application, the excess may be wiped off with a clean cloth. The tissues of the nose may also be protected by petrolatum, paraffin, or some protective ointment. The insertion into the nose of plugs of cotton, moistened

with silicic acid or tincture of myrrh, have been recommended.

3. **Respirators and Goggles**—These may be used advantageously where the exposure to chrome dust is of short duration, but their continued use is to be discouraged and is an admission of failure on the part of the plant to control the hazard.

MEDICAL SUPERVISION

Periodic medical examination and inspection of the skin and mucous membranes of the nose and mouth, on resuming work after absence for any cause whatever, of employees engaged in chrome operations, have been found effective in reducing the prevalence of chrome sores and in indicating the efficiency of protective measures. Such examinations are required monthly in Germany and Great Britain. Note should be made of any small abrasion or cut and the denuded area should be covered with waterproof plaster before resuming work.

TREATMENT

The treatment of any chemical wound is best left to a competent medical attendant. The acute dermatitis readily responds to treatment. Usually the avoidance of further exposure, together with soothing treatment, such as compresses soaked in calamine lotion, is sufficient. According to Trumper[9] as soon as all irritation has ceased, usually in two days, the patient should resume work, visiting the medical attendant regularly for dressing, however. He states that, if patients remain away from work until the cure is complete, they render themselves very liable to a recurrence on resuming work. In the treatment of chrome ulcers, the first treatment is to neutralize the substance at once by a weak alkali or reducer, such as sulphite of soda, and continue the applications as after treatment. A 5 per cent. ammoniated mercury ointment also has been recommended for the treatment of chromium sores. Ulcerations of the nasal septum and advanced skin lesions should not be treated by inexperienced persons, but should be cared for by a doctor.

THE DETERMINATION OF CHROMATES IN THE WORKING ENVIRONMENT

The amounts of chromium compounds present in the atmosphere of workrooms depend upon the extent of their use, the nature of the process involving their use, and especially the effectiveness of measures designed to control their escape into

the air. Bloomfield[10] found that chromium platers in the plants investigated by him were exposed to chromic acid mist in amounts varying from 1 to as high as 56 milligrams per 10 cubic meters of air. Physical examinations of these workers showed that continuous daily exposure to concentrations of chromic acid greater than 1 milligram in 10 cubic meters was likely to cause definite injury to the nasal tissue of the operator. Bloomfield quotes Legge as finding about 0.7 milligrams of bichromate dust per 10 cubic meters of air in the neighborhood of workmen employed in the crushing process in a bichromate factory, and these workers had ulceration and perforation of the nasal septum.

A choice of methods available for determining the air content of these compounds is limited. The usual methods of determining gases by aspiration through some absorbing medium, although accurate, are not generally used, for the reason that it is desirable to employ a more rapid rate of sampling to correspond with the normal breathing rate of the worker, which is approximately one cubic foot per minute, whereas the usual maximum capacity of gas absorption tubes or bottles is approximately one liter per minute or one twenty-eighth of the desired rate.

The method best adapted perhaps for collecting air samples is by means of the Greenburg-Smith impinger[11] provided with the all-glass impinger tube. This same apparatus, in most instances, is used in America for making dust determinations. The impinger collects the sample by aspirating the air and impinging the material onto a flat surface covered by a liquid in a container. The impinger is actuated by suction supplied by steam ejectors operated by compressed air. The rate of air flow, during sampling, is measured by means of a small vacuum gauge inserted into the suction line. It is an advantage, in entrapping chromic acid, to use an alkaline solution as the liquid in the impinger flask. In order to prevent action of the chromic acid on the rubber stopper in the flask, the stopper may be coated with a thin film of paraffin. The paraffin is best applied as a solution of paraffin in a solvent, such as gasoline or carbon tetrachloride.

The chromium contained in the samples may be determined quantitatively by the iodometric method of titration.[12]

Industrial plants usually have their own chemist, who, with a little additional training, can learn the technique of collecting samples and conducting the analyses. A number of states no

doubt offer this service without cost through their departments of industrial hygiene.

BIBLIOGRAPHY

1RAMBOUSEK, J., M.D., *Industrial Poisoning*, Edward Arnold, London, 1913, p. 57.

2TRUMPER, H. B., B.A., B.Ch., *The Health of Chromium Plating Workers*, Journal of State Medicine, Vol. XL., No. 12, Dec. 1932, p. 697, London.

3CAROZZI, L., M.D., *Chromium and Chromates*. Occupation and Health, Brochure No. 147, International Labour Office, Geneva, 1929.

4WHITE, R. PROSSER, M.D., *The Dermatergoses or Occupational Affections of the Skin*, H. K. Lewis & Co., Ltd., London, 1928, pp. 183 and 184.

5TRUMPER, H. B., B.A., B.Ch., *The Health of Chromium Plating Workers*, Journal of State Medicine, Vol. XL., No. 12, Dec. 1932, p. 698, London.

6JOULES, H., M.D., M.R.C.P., London, *Asthma from Sensitisation to Chromium*, The Lancet, No. IV of Vol. II, July 23, 1932, pp. 182-183, London.

7HAMILTON, ALICE, M.D., *Industrial Hygiene*, American Journal of Public Health, Vol. XXIII, No. 4, April, 1933, p. 333.

8BLOOMFIELD, J. J., Assistant Physical Chemist, United States Public Health Service, and BLUM, WILLIAM, Chemist, United States Bureau of Standards, *Health Hazards in Chromium Plating*, Public Health Reports, Vo. 43, No. 26, September 7, 1928, United States Public Health Service, Treasury Department, Washington, D. C.

9TRUMPER, H. B., B.A., *The Health of the Worker in Chromium Plating*, British Medical Journal, Vol. I, April 25, 1931, pp. 705-706, London.

10BLOOMFIELD, J. J., *Poisoning by Chromium Compounds*, Safety Engineering, Vol. 61, No. 4, April, 1931, p. 224.

11GREENBERG, LEONARD, and BLOOMFIELD, J. J., Sanitary Engineers, Office of Industrial Hygiene, United States Public Health Service, *The Impinger Dust Sampling Apparatus as Used in the United States Public Health Service*, Public Health Reports, Vol. 47, No. 12, March 18, 1932, United States Public Health Service, Treasury Department, Washington, D. C.

12SCOTT, WILFRED W., Sc.D., *Standard Methods of Chemical Analysis, Vol. 1, 1927, p. 161, D.* Van Nostrand & Co., New York City.

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PHILADELPHIA BRANCH

The Philadelphia Branch held its regular monthly meeting at the Harrison Laboratory, U. of P. on Friday night February 16th and it was the best turn out we have had for some time, so let's keep going and we will have a still better attendance next month.

George B. Hogaboom gave his talk on the "Recent Results of the Exposure Tests made by the Bureau of Standards and our Research Associate at the bureau in Washington, D. C.," the discussion became so interesting that all other business and papers had to be held over until the next meeting.

After a careful examination of the Plates and studying the slides received from the Bureau of Standards it was the consensus of opinion that the research work should be carried on.

Our research work has now shown what really takes place under definite conditions and it is now up to the members of our Society to also suggest or recommend the necessary standards of deposits for getting better results, it may also be necessary to change these standards from time to time as changing conditions may require.

Without detracting from the work done at the Bureau of Standards, we realize that a lot of credit is due George Hogaboom for the great work he is doing in bringing these results before the members of the various branches of our society, for if it hadn't been for George we would not have been able to know anything about this work at Washington and elsewhere.

This work has really only been started or in other words, the surface has only been scratched when we consider all that could be done to standardize finishes, deposits and methods of deposition and which are so much in demand just at this time of codes and new deals.

It is true funds have failed us but why should we be willing to quit just because it means some more work for us to finish something that we had so much confidence in starting, we still believe as we did at Rochester when we were making a drive for Research Funds, that we must show the manufacturers the results of our work if we expect them to continue to contribute to the Research Fund, and we still believe it's our fault that these funds stopped coming in, for had we shown the manufacturer these results and made definite recommendations as to standard deposits which would give better service than those we are now obtaining, we are sure that funds for the research work would still be coming in to carry on this work. We cannot expect Dr. Blum or our Research Associate and a couple of George Hogabooms to do all this work for us, but that is just what we have been doing.

We believe our Supreme Society Research Committee should see to it that all the branches are shown these slides and plates and that the branches should be formed into local research committees and make recommendations to be sent to the Supreme Society's Research Committee who in turn with the assistance of Dr. Blum and our Research Associate at Washington could then compile these definite results and then they could be shown to all manufacturers.

The showing of these results should not be done by letter or pamphlet alone, but meetings should be arranged and be under the auspices of all the local Chambers of Commerce or Boards of Trade and the Supreme Society, we could then be assured of a better attendance of interested manufacturers and they could see for themselves the results and the good work we are trying to accomplish with their money. So we are asking our Supreme President and the Research Committee through our Monthly Review, that some action be taken at once to keep this work going and not to let it lapse or die a natural death.

We have several letters from members who have asked why we don't raise our membership dues to double or triple of what we are now paying to take care of this research work and also do something for the protection of the foreman plater, "YES", that would be very fine during the high peak times of good salaries, but that is just the kind of a system we have passed through, when everyone would be willing to subscribe to hire a lawyer or someone and put the case in his hands and let it go at that, believing they were doing something grand, but that kind of a system is going into the discard, this new deal of collective bargaining and reasoning is going to make us all take a hand and do something, and what better protection can a foreman plater have than his knowledge of his own work and this can be kept up to date if our members will just make up their minds to spend a little time and effort at our meetings and really get interested in this work themselves. We can hardly make ourselves believe that our members are not interested in their vocation, just advertise something startling or fantastic to take place at the next meeting and you will find a pretty good attendance, but isn't this expecting too much of your officers and committees? Why shouldn't we always have a good attendance without startling or bizarre announcements, also this is a good time to start and make plans for attending our convention in Detroit on June 11th, 12th, 13th and 14th. The Detroit committee have asked for papers and the Supreme Society awards a "Founders Gold Medal" and is awarded for superior and unusual work in the Art of Electro-Deposition that would benefit the membership and the entire industry. This does not mean that it is necessary to submit a new glowing or bizarre finish, an improvement in the deposit or a better way of getting this deposit with all the details as to manipulation of work and solution can go to the making of a superior and unusual work that would benefit the membership and the entire industry.

One of the best and outstanding Gold Medal awards was made by the Society some years ago to Oliver J. Sizelove for his paper and the work he did in working out a simple method of analysis to titrate their daily solutions in the plating room, and this was for the benefit of all our members, so why not "YOU" get busy now and carry along this work another step forward by writing a paper and if possible send samples to the convention committee of some systematic or simple method of knowing the exact thickness of a deposit on the batch of work you just finished and to be able to do this directly in the plating room without the use of elaborate chemical or electrical apparatus, i. e.: A simple way such as taking a brass dummy object and oxidizing it before plating, so a nickel deposit will not adhere to it and putting it in with your batch of work, then after the batch is finished, peel the deposit off of the dummy and

measure the thickness of the deposit with a micrometer, thus giving you the thickness of the deposit on the other objects in this same batch of work; these are the kind of things that are directly beneficial to the foreman Plater.

The next meeting of the Philadelphia Branch will be held at "Adams", 13th and Spring Garden Streets, and will be an OPEN meeting and dinner. Mr. Oliver J. Sizelove will be the guest speaker of the evening and he will have as his topic the "Question Box" also he will answer any questions that arise at the meeting.

This will be a dollar dinner and we expect one of the largest gatherings of the year.

GEORGE GEHLING, *Librarian*

ROCHESTER BRANCH

On the evening of Friday, Feb. 16th, the Rochester Branch held open house and a fish-fry in place of its regular monthly meeting. It was very well attended by members and their friends from both Rochester and out-of-town. After the dinner, a short business session was held during which it was decided that our financial position was now such as to allow us to pay up our total indebtedness to the Supreme Society and the Secretary was instructed so to do. After the meeting we were favored by short talks by some of our guests and out-of-town members which included Mr. Sizleove, Mr. Guy, Mr. Ruff, Mr. Sullivan (the Matchless Metal Sullivan), Mr. Percival, Mr. Baen, Mr. Wheeler, Mr. Kennedy, and Mr. Burns. We also heard from Mr. Kolb and Mr. Fields of the Rochester Branch. After the talks the party started in earnest and did not break up until the wee small hours of the following morning. It was voted by everyone that the party was a huge success. For our March meeting this Branch is to have the pleasure of hearing Mr. G. P. Huntley of the Harshaw Chemical Co. talk on the subject of "Bright Cadmium Plating." All members are urged to attend.

JUDSON R. ELSTER, *Secretary.*

DETROIT BRANCH

The regular meeting of the American Electro-Platers Society was held on February 2nd, 1934, at the Statler Hotel, Detroit, Michigan, at 8:30 P.M. The meeting was called to order by the President, Mr. Hansjosten. The reading of the minutes of the previous meeting was dispensed with, as they had been passed on by the Board of Managers at their meeting.

Mr. Booth, Secretary of the Job Platers, Enamelers and Finishers Institute of Michigan, was then introduced to give us a paper on costs in relation to job plating. Instead of this being a paper, it was really a talk, and it was very interesting. He said that costs in job shops have been rather a hit-and-miss proposition with the majority of the job platers, but that he was working on a very comprehensive chart which would be available to all platers, and would be glad to furnish them to any one upon request. The Branch gave Mr. Booth a rising vote of thanks for his talk, and we trust that the platers in the future will have some way of arriving at costs so that competition may be based on something more than guess-work.

Mr. Slack, President of this same Institute, spoke on the co-operation, etc., of the job platers. His talk was encouraging and very interesting, and while not particularly on plating problems, still the costs in the Plating Department have a very large bearing upon the welfare of the plating industry. Mr. Slack's talk was very well taken, and a rising vote of thanks was also given him.

There was also a paper read by the

Secretary, the subject of which was "Some Laws for Good Work". This paper was interesting and was well taken.

Three applications for membership were passed by the Board of Managers, and ultimately elected to membership: Gerald F. McRay, Carl J. Kennedy, Chas. L. Southwick.

Four applications for membership were received and referred to the Board of Managers for action: Paul Leslie Amundsen, Richard D. Aldorf, A. E. Geise, Edw. Stanley Whithoff.

The following Committees were appointed:

Ex Officio	Mr. J. H. Hansjosten
Finance	Mr. W. W. McCord
Programs	Mr. Chas. Eldridge
Registration	Mr. Edw. Klatzke
Entertainment	Mr. H. M. Cherry
Exhibits & Publicity	Mr. T. C. Eichstaedt
Transportation	Mr. C. L. Southwick

The Finance Committee reported progress and very good prospects.

The Program Committee reported progress, with promise of some very interesting papers for the Program at the Convention.

The meeting adjourned at 10:00 P. M.

THEODORE C. EICHSTAEDT, *Secretary.*

HARTFORD-CONNECTICUT VALLEY BRANCH

The Hartford-Conn. Valley Branch held its January meeting on Monday evening, Jan. 29, 1934, at the home of Mr. W. D. MacDermid, 100 Robbins Ave., Newington, Conn.

In the absence of our President, Mr. Fleming, the meeting was conducted by Past President Beloin. Minutes of the previous meeting were read and accepted. All communications were read and placed on file. The meeting was very well attended, nineteen being present. At this meeting various plans were discussed for creating greater activity, interest and attendance at our meetings.

It was unanimously voted to keep on as we are now doing in regard to our meetings, and that at the end of the fiscal year, the Springfield members as well as the Hartford members, should both petition for a separate Charter for their respective sections.

Mr. Kennedy, our Supreme Editor, gave a very interesting account of the activity of the Supreme body. He also gave us some very encouraging news in regard to the *Monthly Review.*

At the conclusion of our regular business, a most delicious buffet lunch was served by Mr. and Mrs. MacDermid, which was thoroughly enjoyed.

The meeting was adjourned at 11:00 P.M. V. E. GRANT, *Secretary.*

CLEVELAND BRANCH

The monthly meeting of the Cleveland Branch was held on Saturday, Feb. 3rd, at Carter Hotel. The meetin was called to order at 8-15 P.M., with President TerDoest in the chair. The minutes of previous meeting were read and accepted. All communications were read and filed, and all bills were ordered paid. One of our members, Mr. Lyons, gave a talk on Ohm's law as applied to the plating room, which was interesting and appreciated by the members. Mr. Lyons was given a rising vote of thanks. Our librarian, Mr. Thompson, has some good papers for future meetings. So come on, boys, get out to these meetings. W. D. SCOTT, *Secretary.*

MILWAUKEE BRANCH

The regular meeting of Milwaukee Branch was held at Lipps Hall, N. 3rd and W. Highland Ave., Thursday, Feb. 8, 1934, at 8 P.M. The meeting was called to order by President Paul

Krause. The minutes of the previous meeting were approved as read. The smoker committee reported it has a very good educational program for the Smoker Sat., April 7, 1934. At the close of our business meeting, Librarian Henry Binder took charge of the Educational session.

FRANK J. MARX, *Secretary.*

CHICAGO BRANCH

The regular monthly meeting of the Chicago Branch was held Feb. 10, at the Atlantic Hotel. Mr. F. J. Hanlon presiding in the absence of our President E. G. Stenberg and our Vice-President F. Herbst. An application of G. Holmgren read and committee appointed on same.

Mr. Campbell reported J. Grochocki as ill. Mr. C. Tompkins reported C. Clindinin as ill. Chicago Branch extends their sympathy to these two members and hopes they soon regain their health.

A letter from the Detroit Branch urging our members to write practical papers for the convention read and placed on file.

Mr. Faint and Mr. Emery spoke on the Chemistry Class now forming explaining the nights it is held, tuition, etc. The meeting was then turned over to our librarian who found the following questions in the question box.

No. 1. *What is the right procedure to plate inside of brass nickel plated water pitchers? Is tin plate better for this purpose, or is Chrome or any other plate better than tin, for this purpose?*

Answer. Tin is best.

No. 2. *Why is caustic soda used in a Cadmium solution?*

Answer. As a conducting salt, but is not necessary, only in special cases, and is a matter of personal opinion.

No. 3. *What is better to use, degreasing apparatus to remove the heavy polishing grease from work, or to use some other solvent like naphtha or Oleum spirit to clean the work?*

Answer. The degreasing is best as the work comes out dry and clean.

No. 4. *What causes a barrel plated brass to turn black before it can be dried? How can it be remedied?*

Answer. Many suggestions offered but thought too high in carbonates and low in cyanide.

No. 5. *Does Hydrogen Peroxide eliminate hydrogen pitting in a nickel solution?*

Answer. Yes, in ordinary cases.

No. 6. *Why does an addition of boric acid to a nickel solution cause pitting?*

Answer. Many suggestions offered, but thought that the pitting was not caused by the boric acid.

No. 7. *Which one of these two compositions would be best to use in a cadminum plating barrel; they are to be used as panels: Hard rubber composition, or Micarto?*

Answer. Hard rubber.

No. 8. *What is best method of filtering a chrome solution?*

Answer. Can not see any need to filter chrome, if sediment is in solution allow to settle and siphon off clear solution and throw away sludge.

J. W. HANLON, *Secretary.*

BRIDGEPORT BRANCH

At the January Open Meeting in the rooms of the Dictaphone Company, there were sixty members present. Ray O'Conner was chairman of the meeting and Mr. George Hogaboom spoke in the place of Mr. Henry Zucker who had formerly been slated to speak.

Mr. Hogaboom spoke on "Buffing and Buffing Composition." His talk concerned compositions used in buffing and it also pertained to Die Castings.

At the conclusion of his talk, Mr. Hogaboom was tendered a rising vote

of thanks and a Question Box was opened by Ray O'Connor.

Questions dealt with compositions in buffing and coloring brass parts, in lacquering copper after coloring without cleaning and in copper plating.

Refreshments were served after which Ray O'Connor took the members through his plant,—The Contract Plating Company.

WM. FLAHERTY, *Secretary.*

NEWARK BRANCH

The regular meeting of the Newark Branch on Jan. 5, 1934, with an attendance of 30 members. After the regular business had been transacted, the meeting was turned over to our Librarian, Mr. Bert Sage, who introduced Mr. E. Ward who read a paper on Cleaners. This paper described all types of cleaners and also went into detail of the different soap solutions used previous to the metal cleaners. Much discussion followed and the different opinions of the members were voiced.

On Jan. 19, 1934, Mr. Bert Sage had for a speaker, Dr. Klinkensten of the Maas & Waldstein Co., who spoke on lacquers. His subject was Novelty Lacquer Finishes. Dr. Klinkensten, during his talk, showed samples and they were about a hundred in number, describing each and every operation to procure the finish. There were quite a few new sample finishes such as Scotch plaid finish and many other unique finishes. Questions were asked by most all present and much information was gained.

On Feb. 3, 1934, Mr. Sage had Mr. J. W. Kotches, a member of Newark Branch, who presented a very interesting paper on cadmium plating on electrical conduct fittings as manufactured in the plant of Thos. Betts & Co., Elizabeth, N. J. This paper describing each operation from the cleaner to the plating barrel with its automatic conveyor system and the continued filtering of the barrel solutions at the end of each day and the maintaining of these solutions, with the corrosion test given each batch of work and the standard maintained.

This paper brought forth a lot of good discussion and in it many different thoughts. The one question which resulted in a lot of discussion was, *Does a brightener in a cadmium plating bath tend to increase corrosion*?. From the experience of two members present it did but the final answer is still to come.

GEORGE REUTER, *Secretary.*

WATERBURY BRANCH

The February meeting of Waterbury Branch was held Friday evening, Feb. 9th, with President Tennant Elwin in the chair, and a good percentage of the members present.

The semi-annual report of the Supreme Secretary-Treasurer was received with much interest. Regret was expressed, when it was learned from the report, that a loss of 126 members had occurred during the past six months. With the optimism now prevalent throughout the land it is hoped that the industrial and financial conditions of the members and branches in the future will be of such a satisfactory nature as to preclude the possibility of any more long suspension lists.

Another item of news received at the meeting, and not relished, was to the effect that the Research work conducted by the A. E. S., would be discontinued February 1st. whilst no information of an official nature had been received, a few lines in one of the trade journals relative to the same brought up the subject for discussion. Waterbury Branch, in its desire to see the research work kept up, only recently endorsed the suggestion of the Supreme President

of having each member of the A. E. S. contribute one dollar to the Research Fund and donated accordingly. With the numerous propositions being endorsed and sponsored by the CWA and PWA, the question of whether support from either of those bodies might be obtained was brought forward.

The half hour allotted to the reading and discussion of the third paper presented by the Educational Committee entitled "Some Principles of Good Management" proved quite interesting. Favorable action was taken on the transfer of George Dubpernell from Detroit Branch. The Committee on Speakers announced that the next meeting would take place Thursday evening, March 15 and that the Chase Auditorium, on Grand Street, had been secured for the occasion. The principal speaker will be Dr. Wm. Blum, of Washington, D. C. Invitations have been extended to members and friends of Bridgeport and Hartford Branches. The committee in charge consists of Messrs. Ellsworth Candee, Benj. H. McGar and Tennant Elwin.

WM. F. GUILFOILE, *Secretary.*

APPLICATIONS

Amos Earl Judd, 2123 E. North Ave., Baltimore, Md.	Baltimore-Washington
Louis C. Brems, 134 Argonne Dr., N. Chicago, Ill. (Asso.)	Chicago
G. Holmgren, 1522 W. Austin Ave. Chicago, Ill.	Chicago
C. L. Southwick, 116 Courtland Av., Highland Park, Mich.	Detroit
C. J. Kennedy, 5712 12th St., Detroit, Mich.	Detroit
Gerald F. McCray, Eaton Clock Co., Detroit, Mich.	Detroit

ELECTIONS

Charles Marie,9 Rue de Bagneaux,Paris,France (Asso.)	Baltimore-Washington
L. C. Brems, 134 Argonne Dr., North Chicago, Ill. (Asso.)	Chicago
E. A. Lanz, 426 S. Clinton St., Chicago, Illinois	Chicago
H. P. Metzger, 1845 Wellington Ave., Chicago, Ill.	Chicago
C. L. Southwick, 116 Courtland Ave., Highland Park, Mich. (Asso.)	Detroit
C. J. Kennedy, 5712 12th St., Detroit, Mich. (Asso.)	Detroit
Gerald F. McCray, Eaton Clock Co., Detroit, Mich. (Asso.)	Detroit

DEATH

James A. Simpson, 160 Adams St., Lakewood, R. I.	Providence

SUSPENSIONS

Euclid Perreault	Providence	L. M. Hofmeister	St. Louis
Leo. M. Demars	St. Louis	H. A. Doerr	St. Louis
Geo. Marsh	St. Louis	Geo. A. Miller	St. Louis
G. C. Pahlow	St. Louis	Frank W. Lafser	St. Louis

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